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X.—*The Genus Oldhamia (Forbes): its Character, probable Affinities, Modes of Occurrence, and a Description of the Nature of the Localities in which it occurs in the Cambrian Rocks of Wicklow and Dublin.* *By* JOHN ROBERT KINAHAN, *M. D., Professor of Zoology, Department of Science and Art.*

Read April 12, 1858.

IN certain schistose beds found at Bray Head, county of Wicklow, and Howth, county of Dublin, and which by the geologists of the United Kingdom are assigned a place among the Cambrian system, or that which at present is universally recognised as the lowest of the stratified rocks (whether, as some assert, itself a system distinct from the Silurian; or, as others look on it, only a large portion of, and not distinct from that formation), are found certain markings of a very peculiar nature, occurring in mass, and now generally recognised as casts of an animal assemblage, belonging either to the Polyzoan or Hydrozoan alliance. To seek out the probable zoological relations of these, and to describe the varieties which are found, is the intention of this paper. The fossils never having been described or figured, with the exception of a few imperfect figures—e. g., the small woodcut originally published by SIR RODERICK MURCHISON in "Siluria," and which has been repeated in other works, such as the lamented HUGH MILLER'S "Testimony of the Rocks," in which the locality whence the specimen was obtained is misquoted as "Wray Head" for Bray Head—it is proposed to figure here the more important varieties which occur; the woodcuts accurately taken from specimens obtained by myself at Bray Head, and elsewhere, and which I have placed in the National Museum, at the Royal Dublin Society, in this city.

Although geologists are now perfectly agreed as to the organic nature of these remains, it may not be unnecessary to recapitulate the points which distinguish them from the pseudomorphic shapes masses of crystals often assume. First: their symmetrical regularity of form, this having a constancy of direction as regards the bedding, not passing through it in every direction, as crystals always do. Second: the mode of their occurrence, abundantly, yet not universally, distributed through the beds, the fossils bearing a uniform relation to the line of stratification of the beds in which they occur. Third: the permanency of character of the fossils, even when the beds are situate in localities at great distances from each other, and are dissimilar in their chemical and physical constitutions. Fourth : the constant occurrence of the fossils in beds whose formation is due to aqueous action ; in certain portions only of these ; and almost always in company with traces of undoubted remains of animals of aquatic habits, identical with archetypes existent at the present day. And, lastly: the close agreement of the fossils in form with certain living aquatic types. These characters conjoined supply a mass of evidence which render untenable every theory which would assign to these fossils any origin save that before stated, viz., that they are what are commonly called organic remains, and, accordingly, the genus Oldhamia is now recognised in all books on Palæontology.

Before proceeding to the consideration of the affinities of the fossil, it will be but right to mention briefly the more important communications relative to it published in geologic works,—a task fortunately comparatively light, as, if we except its discoverer, the only author who has given us any information regarding it is EDWARD FORBES,—other authors contenting themselves, as far as I can learn, with recording its existence, without any notice of its mode of occurrence or structure.

The earliest reference to this fossil will be found in the "Journal of the Geological Society of Dublin" for 1844. In an abstract of a paper on the Rocks at Bray Head, by T. OLDHAM, Curator of the Society, afterwards Professor of Geology in Trinity College, and now Director of the Indian Geological Survey, where, in combating the idea that the great rock mass now called Cambrian was primary, the author states that he "had not as yet been successful in finding organic remains in the slate rocks Bray Head, with the exception of some small *zoophytic markings*, which did not appear referable to known genera."—vol. iii. p. 68.

The next notice occurs in the same Journal, an abstract of a paper read 15th November, 1848, "On Oldhamia, a new genus of Silurian Fossils," by

Edward Forbes, Palæontologist to the Geological Survey, in which the following sentences occur:—

"These bodies (i. e. certain plant-like impressions) present the appearance in most specimens of a central filiform axis, with fasciculi of short radiating branches proceeding from its sides at regular intervals, or of branches of such filiform rays without an axis. A close examination of them shows, that each branch is formed of a series of articulations marking the positions of minute cells. *The entire body presents a striking resemblance to the arrangement of parts in certain Zoophytes, as in* Sertularia cupressina, *but also consistent with those exhibited in many Bryozoa* (Polyzoa), *as in Gemellaria and Cellaria, an alliance more in accordance with the minute structure.* I propose the name Oldhamia for these remarkable fossils in honour of their discoverer, who has in them made us acquainted with what in all probability is a group of *Ascidian Zoophytes, or rather compound tunicated Mollusca,* in stratified rocks of a very early date."—vol. iv. p. 20.

I omit the rest of the abstract, as not bearing on the subject, and have italicized those parts of this description to which I wish particularly to refer.

Two species of the genus thus published were subsequently distinguished by Professor Forbes (but without description, that I can find), under the names of *Old. antiqua,* and *Old. radiata,* and are to be found commonly in museums, and also in catalogues of fossils under these names.

We now proceed to the subject of the affinities of the group, omitting for the present a detailed description of its characters.

Probable Affinities of Groups.

Professor Forbes, as will be seen from the extract given above, while suggesting the possibility of either of two distinct alliances for these fossils, obviously leans more strongly to that which supposes them to have been Polyzoan molluscoids; and, if I venture to dissent from an opinion put forward by one deservedly of so much authority as an accurate and philosophical observer, it is solely because I have had more numerous and better opportunities of studying these fossils than fell to his lot—having for the past two years been making frequent, often nearly daily, examinations of the rocks at Bray in which the fossils occur. I should state, also, that I had arrived at this conclusion as to their nature, long before I read Forbes's opinion on the subject, or before I was aware of its existence, as my study of the fossil was made in the field in the first instance as a mere amusement, not with the object of either establishing or overturning any theories. I feel strengthened in my opinion, as I find that every naturalist I have spoken to on the subject, or shown my specimens to, since, seemed to be of the same opinion. It must, at the same time, be confessed, that to bring forward any argument in favour of Hydrozoa over Polyzoa, which will *appear conclusive on paper*, is a task of extreme difficulty. The distinctions between the two alliances, though tangible enough to the practised eye, cannot be described in such precise language as will be diagnostic to every reader; these distinctions being only appreciable on a careful and patient comparison of the general characters of an obscure structure, which, owing to the similar mode of growth in the two groups of animals, is almost undistinguishable in the two cases; and by a cautious consideration of the true bearing on the general character of the two groups, of those several points of structure which are yet appreciable.

This difficulty, need not cause any astonishment, when it is recollected that but a few years since these two great groups, the Polyzoan Mollusc and the Hydrozoan Acrite, were unhesitatingly classed together; and furthermore, that even among recent species, widely different as the animals are in their structure, and the relation of their organs, yet in many cases, so similar is the arrangement of their parts, it is impossible to decide *à priori* from the skeleton whether it is a Polyzoan or Sertularian Hydrozoan which is under examination,—in our present state of knowledge, a reference to the soft parts alone enabling us positively to determine the question.

If we compare *Oldhamia antiqua* (Fig. 1) with specimens of *Sertularia argentea*, the resemblance is so close, that some years since these would have been by palæontologists pronounced *specifically* identical. In fact, by embedding in plaster the dried polypidom of *S. argentea* dredged at Bray, and from this artificial fossil taking a cast, I have obtained casts which, in no respect, differ from the specimen of Oldhamia, of which Fig. 1 is an engraving.

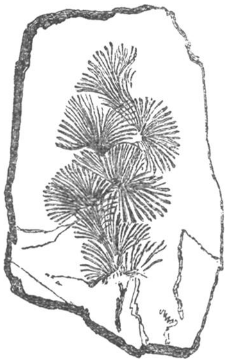


Fig. 1. *Oldhamia antiqua:*—erect polypidom exhibiting alternate mode of growth of fasciculi of branchlets and ordinary appearance of fossil. Beyond Brandy Hole, Bray Head.

After a careful examination of a great number of the recent Polyzoa, I have never yet met a species which approaches these fossil forms, nor can I perceive in Oldhamia the minute structure spoken of by FORBES as more in accordance with the Polyzoan alliance than the Hydrozoan. There is among the collection of the Geological Survey of Ireland a fossil marked from the beds at Carrickmount, but which is yet undescribed, and more like a Polyzoan than a Sertularian ; perhaps this may have been the specimen which was under FORBES's eye when he penned those remarks. I have not described this till I have seen more specimens, and know more about its locality, but it is certainly unlike Oldhamia.

The mode in which these remains occur in matted masses may be seen among the Sertularidæ any day, but I am not aware that any such great *gregarious* assemblages of the Polyzoa occurs, at least among our recent species of this form. This is, however, an argument of little moment. The places in which it occurred also appear to have been similar to those in which Sertularidæ of our day most love to dwell.

We shall next proceed to the consideration of the characters of the genus.

Mode of Occurrence and Generalities concerning Genus.

The species described by FORBES are so dissimilar in appearance that it is questionable whether it would not be more convenient to place them under separate genera, especially as there is a second type like *Old. antiqua*, which I propose to describe as distinct; *Old. antiqua* (Fig. 2), and the undescribed form, for which I propose the provisional name of "discreta," being furnished with a distinct axis, from either side of which alternating fans of branches arise at regular intervals ; while *Old. radiata* (Fig. 3) is destitute of any central axis—its mode of growth irregular, the branches springing from a common point, so that the polypidom, flattened from above, is stellariform more or less regularly, according as the axes are equal in length or not. The radial character of this form is occasionally badly marked (Fig. 4), so that it has been surmised that two forms were confounded under the one name ; but in our present state of knowledge it appears unadvisable to name this variety, as it is not more distinct

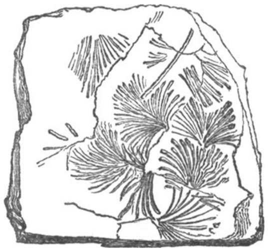


Fig. 2. Convolute polypidom of *Oldhamia antiqua*, exhibiting enlarged summits of branchlets. Bray Head.

than many forms of living Sertularidæ which have been proved to be the same. Intermediate forms between the two exist.

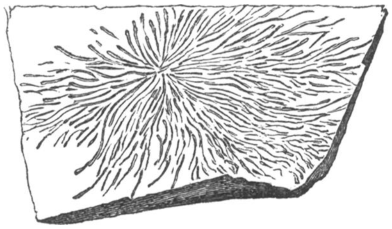


Fig. 3. *Oldhamia radiata.*—A cast. Bray Head. The opposite side of this specimen exhibits *O. antiqua.*

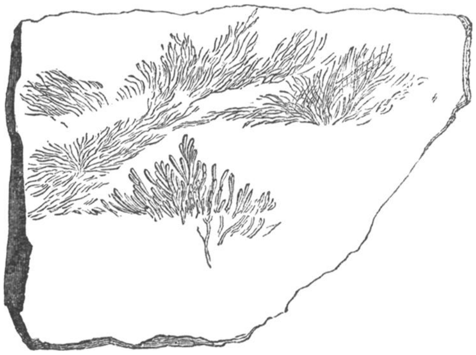


Fig. 4. *Oldhamia antiqua.*—Creeping form. Graystones, county of Wicklow.

In the manner of their occurrence, *Old. radiata* and *Old. antiqua* are similar. Immense beds, or series of beds, often several feet thick, as the section

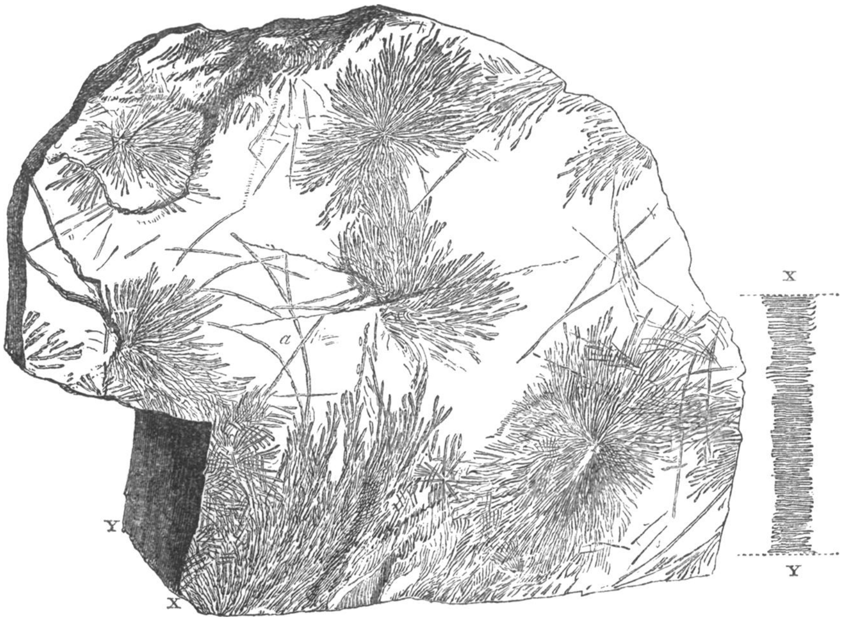


Fig. 5. Slab of *Oldhamia radiata*, exhibiting the ordinary radial character of the animal. *a*, the elongated form, and XY, the depth of the bed. Graystones, county of Wicklow.

EXPLANATION OF SECTION.

1. Greenish-gray bed of closely compressed *Oldhamia radiata*, 12 inches thick.
2. Green compact quartzose grit, underlying greenish-gray schist, on which it also rests; 7 feet 7 inches thick.
3. Thin layer of *Old. radiata*, badly marked, lying on green and red schists, which are interspersed with vertical and horizontal Arenicolites, and gradually pass into red grit; from 18 inches to 2 feet 6 inches thick.
4. Red shale; fine red micaceous gritty slate; compact red shale; 9 inches thick.
5. *Oldhamia radiata* in series of beds from 0·25 inch to 3 inches, interstratified with compact red shale; series of beds 15 to 24 inches thick.
6. *Oldhamia radiata*, in thin beds, interstratified with red shale and green grit; 12 inches thick.
7. Compact red grit, with traces resembling coral; 15 inches thick.
8. Compact red shale; 6 inches thick.
9. Red schist and *Oldhamia radiata*, in beds, passing into red grit; scattered fans of *Oldhamia antiqua* also rarely occur here; 15 inches thick.
10. Grit, similar to No. 2.

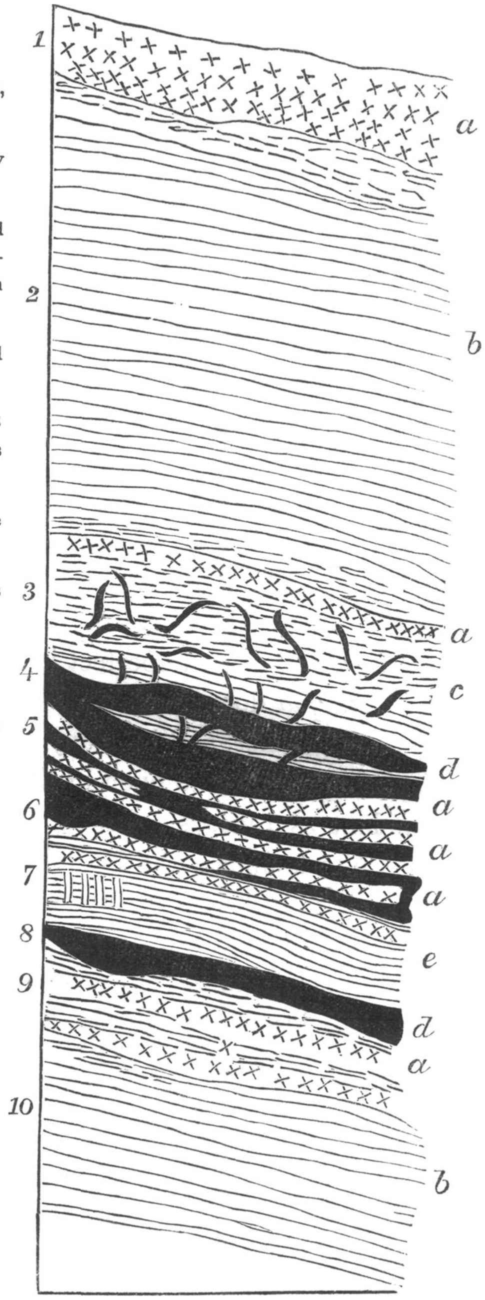
✕ *a* *a*, Oldhamia beds.

☷ *c* *c*, Schist and slates.

☰ *b* *b*, Quartzose grit beds.

■ *d* *d*, Shales.

▥ *e* *e*, Coralloid traces.



Vertical Section of Rock in neighbourhood of Periwinkle Rocks, Bray Head, showing General Relations, and Lie of the Fossiliferous Strata. These beds are much distorted.

given at page 553, taken near the Periwinkle Rocks, Bray, shows, the beds being constituted of a matted mass of polypidoms. These are in layers, compressed, and more or less intermingled with the substance of the rock, which varies from a fine sandstone of extreme hardness and crystalline structure to a friable shaly bed, with but little lamination. The best marked specimens and thickest beds occur in the harder rocks.

The beds in which *Old. antiqua* occur are never of the extreme hardness of those in which *O. radiata* is found most abundantly. The beds are indifferently either red or green in colour. In the shaly beds, which, much softer in texture, underlie the grit beds, the fossils occur only as scattered fans, or broken and fragmentary filaments. In the denser beds the whole mass is so compressed and intermingled as to render it impossible to make out more than a confused radiating structure. Fig. 5 (p. 552) represents a specimen from such a bed, in which, however, the fossil is better marked than usual ; the section at the right-hand side of the plate shows the true thickness of the bed. Distortion by means of cleavage occurs ; this is represented in Fig. 9; the woodcut, however, gives but an imperfect idea of the specimen.

Old. antiqua does not, as a rule, occur in either as dense or thick masses as the other species, and in many stations in Bray it merely, as it were, coats the top of the beds, and even in the thickest series of beds it is seldom, if ever, so abundant as regards specimens; the beds in which it occurs also readily separate into laminæ. At Howth it is equally sparingly diffused in the slaty beds in which it occurs at Puck's Rocks.

These facts would lead to the surmise that these were animals dwelling in a sandy sea bottom, mud being obnoxious to their existence.

The species occur distinct, but beds of *Old. antiqua* are sometimes interstratified between those of *Old. radiata*. One specimen, a quarter of an inch thick, Fig. 3, upper surface, exhibits *Old. antiqua* with an odd star of *Old. radiata* on one side, and *Old. radiata* on the other. Scattered fans of *Old. antiqua* sometimes occur, though rarely, in the beds of *Old. radiata.* So that it is evident that the species lived under different conditions, *Oldhamia antiqua* in the muddier seas, and least abundantly, and that hence the species have been preserved distinct, exactly as at the present day, when two species of animals, inhabitants of the same bay (but either dwelling in different depths, and, therefore, subject to the action of different currents, or else in their greatest abundance, or decay, at different seasons) will be found to abound among the drift at distinct periods.

It is remarkable, also, that *Old. antiqua*, though the stations in which it occurs are numerically nearly equal to those in which *O. radiata* is found, yet neither are the series of beds as well marked, nor the specimens, as before stated, as numerous.

The beds in which the fossils of both species occur are remarkable for being permeated by those long, rounded fossils to which I drew attention in a paper read before the Geological Society of this city in November, 1856 ;* and subsequently described more in full before the same Society, and also in a communication laid before Section C, British Association, September, 1857 ;† and then proved to have been the tracks of wandering worms, and also of worms of a type probably allied to the common *Arenicola piscatorius.* The openings of the burrows of three of this latter type are figured in Fig. 6. These annelidan tracks generally are most abundant in the beds above the layers of Oldhamia, and sometimes passing from the beds beneath these to the bed above They afford a strong proof of the former organic nature of these fossils, as the worms which formed them probably derived a great portion of their nourishment from these decomposing zoophytes.

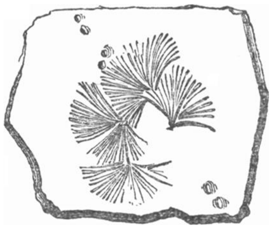


Fig. 6. Convolute polypidom, *Oldhamia antiqua.*—The fasciculi of branchlets developed on one side of axis only; three pair of openings of burrows of *Arenicolites didyma* (*Salter ?*) are shown. Bray Head, beyond Brandy Hole.

DESCRIPTION OF GENUS AND SPECIES.

Oldhamia (*Forbes*).

Polypidom rooted, plant-like, variously branched, stemmed, or the branchlets arising from a central point; stems erect or creeping; branchlets irregular, dichotomous (?) ; cells biserial, alternate or subalternate.

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* Journal of the Geological Society of Dublin, vol. vii., p. 184, Plate v., Figs. 1, 2, 3, 4, 5:—"On Annelidoid Tracks in the Rocks of Bray Head."

† Journal of the Geological Society of Dublin, vol. viii., p. 68, Plate VII., Figs. 1, 2:—"On the Zoological Relations of Bray Head and Howth, with an Account of the Fossils of Irish Cambria."

Oldhamia antiqua (*Forbes*). Figs. 1, 2, 6, 7.

Polypidom cauliferous ; stem percurrent, sub-flexuous, filiform ; furnished with short fan-shaped branchlets, arranged at regular intervals ; branchlets straight, very slightly sub-flexuous, few in number ; cells biserial and alternate. Locality: schist rocks, Bray, Graystones, Carrickmount, county of Wicklow; Howth, county of Dublin.

Two varieties of this are figured: Figs. 1, 2, 6, represent the ordinary form; the fans are far apart and distinct, and their secondary axes few in number, somewhat dichotomous ; the cells which constitute them well marked.

The second variety (Fig. 7) is often mistaken for a state of *Old. radiata*, but is readily distinguished by the presence of the central axis. In this the fans are closely crowded, their terminating cells broader than the basal ones, so that in some specimens these are quite club-shaped ; the secondary axes are numerous, much more so than in the other form. All the specimens figured are from Bray Head.

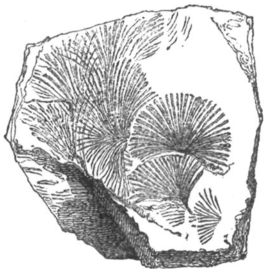

Fig. 7. *Oldhamia antiqua*(?) exhibiting closely crowded fasciculi, and numerous branchlets. Bray Head.

The specimens from Howth differ in some respects from those at Bray, and may be a distinct form. The secondary axes are broader, markedly so towards their tips ; the fans few rayed, far apart, and patent. Fine specimens may be seen in the Geological Survey Collection at the Museum of Irish Industry. The same form occurs at Carrickmount Reilly, county of Wicklow. The specimens of this species which occur scattered through the red shale at Bray are much finer in texture than any of the varieties described.

Among the specimens collected by the officers of the Survey, some years ago, at Carrickmount, county of Wicklow, are several, occurring in a yellow schist, which are so different from any of the varieties of *Old. antiqua*, that I propose to describe it as specifically distinct, provisionally, as follows:—

Oldhamia discreta (*n. s.*).

Polypidom cauliferous ; stem percurrent, filiform, furnished with densely crowded alternate fans of branchlets ; branchlets flexuous, dichotomous, very numerous, filiform ; cells biserial, alternate, strongly marked.

This form differs from *Old. antiqua* in its more crowded fans of branchlets, which nearly completely conceal the stem, the branchlets are flexuous, but at the same time more delicately filiform ; the whole polypidom, in short, more delicate.

The distinctions between the two are similar to, but much more marked than, those between well-marked specimens of *Sertularia argentea* and *Sertularia cupressina.* However, in instituting this comparison it should be borne in mind that *Oldhamia antiqua* approaches in appearance *Sert. argentea* more closely than *Sert. cupressina, Old. discreta* being even finer than *Sert. argentea,* and not resembling *Sert. cupressina.*

No forms intermediate between *Old. antiqua* and *Old. discreta* have occurred to me, which confirms the idea of their being distinct. Badly marked specimens of *Old. discreta* cannot without difficulty be distinguished from some forms of *Old. radiata.* The best marked specimens I have seen are those in the geological collection already referred to ; but I believe I have met the species myself at Graystones, in the railway cutting, where the form to which I would restrict the name of *Old. antiqua* also occurs, but rare.

Oldhamia radiata (*Forbes*). Figs. 3, 4, 5, 8, 9, 10.

Polypidom gregarious (?); many branched ; branchlets arising from common point ; cells biserial, alternate, branchlets (*a*) dichotomous, arranged in form of a star; (*β*) (Fig. 4) branchlets irregular, patent, markedly dichotomous, thickened at the ends, the whole polypidom creeping. Oviferous capsules (?) axillary, elliptical. Locality: Bray, Graystones, Co. Wicklow.

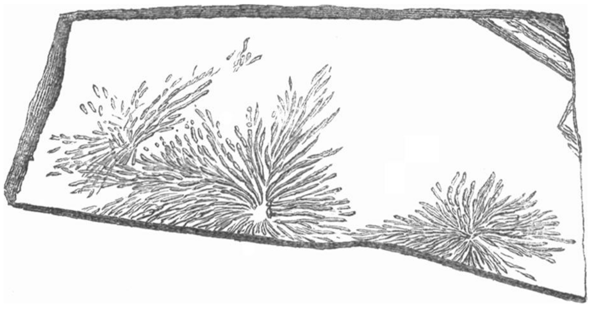

Fig. 8. *Oldhamia radiata.*—Ordinary form. Bray Head.

There are many well-marked forms of this, but intermediate forms connect them with each other. Figs. 3, 5, 8, 10 exhibit the ordinary and most typical form.

Sometimes in place of the branchlets proceding from the same point, the whole polypidom is lengthened upwards, but without a central axis, resembling *Sertularia operculata* among recent species. When the branchlets are much divided, this form might be mistaken for *Old. antiqua;* a badly marked specimen of it is seen near the letter X on the slab figured as No. 5.

Sometimes a single branch is elongated, as is seen in Fig. 10; this form proves the necessity for uniting the well-marked variety just described, and the typical form. In the variety figured at (*a*) (Fig. 5), the cells are simply placed end to end, without any branchlets, and the whole polypidom is long and unbranched; this stem sometimes, as it were, breaks out into branchlets, which are then arranged in a stellariform manner. I think it probable that this form was creeping. An interesting modification of this is, that in which the unbranched axis springs from the centre of one of the ordinary typical specimens, and then itself bears a star on its summit; workers among recent species are well acquainted with similar, as they are called, proliferous polypidoms, especially among the Sertularian Hydrozoa.

There is yet another remarkable form, indicated as form (β) in the description of the species, viz., that in which (Fig. 4) the polypidom is procumbent and repent; the dichotomous branchlets developed numerously along one side, but with great irregularity, these branchlets being markedly dichotomous, also much thickened at the ends. The intermediate forms forbid this being separated from the type except as a variety,—especially as similar differences, as before remarked, exist between forms of recent species.

Distortion, probably arising from cleavage, in this as in other fossils, exerts occasionally a remarkable influence over form. One specimen is figured (Fig. 9) from a much contorted red schistose bed at Bray.

In certain specimens, as, for instance, that figured as Fig. 10, in the axils of the cells, of which the branchlets are composed, occur certain elliptical bodies, best seen in the casts of the fossils; these I am inclined to believe are oviferous capsules; they are rare, and still more rarely well marked; probably, when attention is called to them, they may be better made out. I have not met them as well marked in *Oldhamia antiqua*, but traces of them occur.

The remarkable differences in physical characters between the beds in which *Oldhamia radiata* occurs, and those in which alone *Oldhamia antiqua* is met with, has been already referred to, and point, as there stated, to a very different character in the sea bottoms, of which each was an inhabitant. The non-occurrence of the former species at Howth may be thus accounted for. The beds there, few in number as they are, in which I succeeded in detecting *Oldhamia antiqua*, are all soft slate, splitting readily into thin laminæ, such, in short, as would result from a muddy deposit. The rock in which the Carrickmount Reilly specimens are embedded is similar in character; and all the specimens thence are either *Old. antiqua*, or *Old. discreta;* if *Old. radiata* exist there, I would not expect it should be got in these beds. This difference in habitat is a point which might be worthy of consideration with regard to the division of the genus.

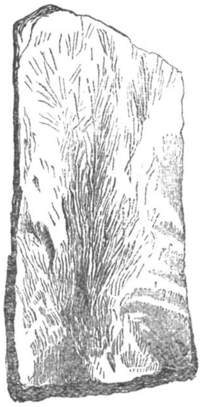

FIG. 9. *Oldhamia antiqua.*—The elongated form still further drawn out by cleavage. From Bray Head.

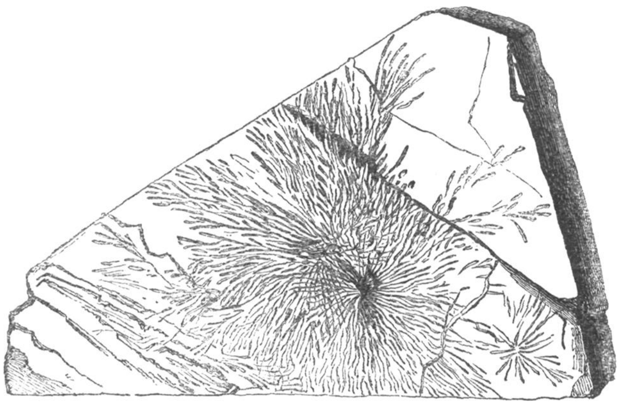

FIG. 10. *Oldhamia antiqua.*—Two polypidoms overlapping, exhibiting central axis, elongated branchlets, and oviferous capsules. Graystones.

There is a state of *Old. radiata* which is frequently, in museums, mistaken for *Old. antiqua*, where the stars overlap one another in a sort of alternate manner; the absence of the median axis and the irregularity of the branchlets may distinguish it.

Some have, on a hasty examination of an imperfect series of specimens, suggested that probably the two species established by FORBES are really but one. An examination of the fossils in position in the field will show the absurdity of this idea; the differences between the two becoming more and more evident on examination of a lengthened suite of the fossils, as this enables us to define the limits of each accurately, and to refer to their proper respective types the apparently intermediate forms, which might otherwise tend to confusion.

I have entered with some prolixity into many of the points connected with these fossils, as, owing to the comparatively limited district in which they are found, most palæontologists have had but little opportunity of studying them in the field, and hence probably has it arisen that this genus, from its geologic position one of the most interesting we possess, has not been long ere this fully described, although probably there is no fossil known which is so easily obtained, occurs in such masses, or tells the history of its mode of life in more unmistakable language. For a similar reason I have figured the species at some length, the only species unfigured being that for which I have proposed a new name, and of which it is nearly impossible to render the distinctive characters in a woodcut.

One other conjecture relative to the origin of these fossils should be adverted to. Some have suggested that they may have been sea plants. This opinion is now, I believe, abandoned by every one who has had an opportunity of examining the fossils *in situ;* and furthermore, as has been shown, their animal connexion bears the stamp of the judgment of one of the greatest and most philosophical naturalists of modern days, EDWARD FORBES.

I have not adverted to the opinion of Continental writers, as these are necessarily most of them taken at second-hand from the description of the English authorities ; but I may mention that I find from BARRANDE that in Germany the possible vegetable nature of the fossil is considered an open question. D'ORBIGNY has declared for its animal nature, and the other opinion probably but awaits the general diffusion of typical specimens to entirely vanish.

The figures of this species hitherto published are most of them either ideal, or else copies one of another, and are so scanty in detail that they are with one or two exceptions hardly worth notice. Sir RODERICK MURCHISON, as already stated, gives a characteristic figure of *Oldhamia antiqua* ("Siluria," p. 180, 3rd ed.) Sir CHARLES LYELL has figured both species ("Manual of Elementary Geology," 5th ed., p. 453); it has been also figured in some of the American books on the subject of geology.

In describing *Oldhamia radiata* it will be remarked that no comparison has been instituted between it and any living type: in fact, I do not know any which comes as close to this species as *Sertularia argentea* approximates *Oldhamia antiqua*, none of the Sertularidæ growing in that regular stellariform manner except one or two creeping species; but in that case some traces of the body to which the polypidom was attached ought to have been found; unless, indeed, this is a species growing free at the surface of the water, which appears a most improbable supposition. There are, I am aware, a few species of creeping Polyzoa, which have a mode of growth somewhat resembling *O. radiata*, but it appears to me that *Old. antiqua* must have been a Sertularian, and it is, therefore, more probable that *Oldhamia radiata* was so also.

There remains now but to sum up in brief the points established in the review of this genus, which are:—

In the schist rocks of the Irish Cambrians, beds occur of considerable thickness, traceable continuously for many hundreds of yards, which are composed almost entirely of the polypidoms of an extinct Sertularian which occurs in connexion with other extinct aquatic types, such as Annellids, Mollusca (?), and Asteroid Polyps (?).

That these fossils, judging from the almost absolute identity of one of them with the polypidom of a living Sertularian type, are more probably the polypidoms of extinct Hydrozoa than cœnœcia of Polyzoa. And—

That judging from their state of preservation, their mode of occurrence in enormous masses, and the nature of the rocks in which they occur, they were originally the inhabitants of a comparatively still sea, and deposited by a gentle current on the shores of a shallow sandy bay.